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ABSTRACT

This annotated bibliography includes summaries of 21 articles and books dealing with school physical education and athletic facilities. A brief introduction discusses recent innovations in the design and construction of athletic facilities, with particular emphasis on the need to accommodate increasing year-round sports participation by both male and female students, as well as by the general public. Annotations range from approximately 100 to 275 words. (JG)

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Physical Education Facilities

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[75]

EA 007 391

Annotated Bibliography

A new philosophy is developing in physical education, recreation and athletics that is causing the planners to seek completely new approaches to construction. No longer are high school and university students prepared to have the "jocks" monopolize all the facilities. The swing to participation by all in lifetime sports is creating shortages of space all across the North America. Recently, girls and women have been accorded equal rights in athletic programs, so that space will have to be provided for their use. The community-use concept means that many adults that were previously not considered are going to be using facilities. The literature indicates that architects and engineers are coming up with a number of ideas aimed at satisfying the needs outlined above.

Air-supported roofs, first proven viable at Osaka World's Fair, provide a cheaper, lighter, and easily-constructed cover for immense areas of indoor-outdoor playing surfaces. The newer "double-bubbles" provide an insulation factor that makes them more acceptable in extremes of temperature. They can also be inflated in a horizontal position if supported by cables, thus allowing them to be rolled back to provide an open-air space in fine weather. Teflon-coated fibreglass seems to be the best material for these structures in that it will last from ten to twenty years.

Combining the year-round use provided by the bubble covers with synthetic playing surfaces provides for the greater participation requirements. These surfaces are wear and weather resistant, as well as being easily changed for different types of sports where necessary. Where all-purpose surfaces are combined with removable court markings, changes between sports usages can be effected very quickly also.

Schools are now moving toward a modular system of construction where students can move from a central control area to demonstration and participation courts that radiate out, with relative ease. This arrangement makes possible participation by youngsters in many individual and dual sports within easy supervision distance of the instructor. In such a system, six or eight different activities areas with as many games will be going on at the same time.

Girls' and womens' sports areas require few changes from the men. However, in institutions where dressing room space has not been provided in the past, designers are using ingenious systems of doors to provide for joint-use by the sexes. This is not as great a problem as had been expected in that it has been found that most after-hours users dress at home and walk or drive to the field.

But what of the old facilities that we will have to continue using for many years? Again the modern materials de-

scribed earlier can be employed to make them into multi-purpose, year-round facilities. The football stadia and basketball gyms are being converted to facilities for all, and can still be used as spectator-sport centres. Swing-out stab walls and pivotal bleachers are being incorporated into these structures to provide the versatility needed.

In elementary schools where mass participation is getting its start through the movement-education approach, there is a similar need for innovation to provide facilities. Up to this point, less creative work has been done at the elementary school level. Swing out climbers and provision of larger quantities of equipment are needed for all elementary schools if a strong base of participation is to be developed. Consideration must also be given to adapting elementary facilities for use by the adult population during evenings and week-ends.

As in most human endeavour, the social changes must precede the actual application of technical expertise. If the swing to greater participation at all levels continues, there will be a great need for architects and engineers to create and plan the structures required. Judging from the work already being done, the creativity and construction genius is available. The results in healthier, happier people will produce benefits far greater than the costs of construction.

"Advanced, Encapsulated Field House", School and University, 44-3, pp. 31-33, November 1971, EJ 047 237.

The air-supported structure is being tested at its greatest size in Tennessee, where the Milligan College will have the first of such covers plus the safety of cable restraints in case of air failure. The structure is column-free, light and relatively cheap to erect. Accoustics and lighting are minor problems, but should be easily resolved. Once again, the need for a large all-weather area for use by college and community is the challenge. Experience at the U. S. ~~Painbon~~ Pavilion in Osaka, Japan suggest that the experiment will be a success.

Baas, Alan M. Physical Education Facilities. Educational Facilities Review Series No. 14, February 1973, p. 8, ED 072 512.

Current thinking on elementary and secondary school physical education emphasizes motivating young people to develop habits of physical exercise that will persist into adulthood. To help foster such a lifetime commitment, athletic programs must include a range of opportunities for students to realize their particular physical potentials. Accordingly, physical education facilities must accomodate numerous individual and group oriented activities. The reviewed documents are restricted to issues of design and construction and concern indoor facilities, outdoor areas and swimming pools.

Browne, Robert Lee. "Innovations in Sports Facilities", American School and University, 44-3, pp. 24-30, November 1971. EJ 047 236.

A number of easily-achieved improvements in gym construction should be included or at least considered for all new construction. Location is a first consideration. With new emphasis upon participation, facilities for student use should be erected within easy walking distance of dorms and other class activities. With light weight roof materials such as teflon-coated fibreglass, large spaces can be covered. Similar lightweight dividers of nylon netting can make available a variety of spaces. Care needs to be taken in choosing the overall size of spaces in order that the best utilization of the area can be made. Modules of space 60'x120' appear the most useful.

Similarly outdoor spaces need to be looked at for best utilization of acreage. Consideration is being given the square track with rounded corners as the best size in which to incorporate a variety of simultaneous activities. Radius of corners is 105' with four straight-aways at 165' each. This space is much more useful than the traditional oblong track. Playing surfaces should make use of the versatile synthetic materials available today. With possible conversion of existing structures and spaces, use of rooftops for playing areas much more available exercise stations are possible.

Brown, Robert L. "Multi-purpose Facilities: More Use Per Inch, Per Hour, Per Student", American School and University, Vol. 47, No. 3, November 1974, pp. 23-27, EJ 107 267.

In answer to the demand by students for more and varied uses of athletic facilities, designers are now having to make use of synthetic materials for floor surfacing to withstand the greater amount of traffic, improved retractable seating to allow for participation during non-spectator times as well as the longer spans needed to provide this increased space. Improved technology has made it possible for architects to design these kinds of facilities.

Adaptability is the key. Parks are being built to accomodate the greater lengths required for metric distances as are tracks. Floor and field markings have to be put on with easily-lemaned paints, or, as is being experimented with, electronically changed with the flip of a switch.

Minor problems are being ironed out in order to make facilities available on a 24 hour basis 365 days of the year. The higher capital costs are warranted by this extra usage.

"Bubble, Bubble, Less Cost, Minimum Trouble." Nations Schools, 45-2, pp. 76-78, February 1970, EJ 014 550.

Inflatables are assessed as to their usability for schools, recreation centres, etc. They are cheaper to build and faster, but vandalism is a problem so that maintenance and replacement costs are high. The double bubble avoids the domed appearance, and can be used as a horizontal roof when supported on cables. Doubles can also be used to insulate which makes them much more useful in cold climates. The fear of a burst or deflated bubble appears not too serious. Cable supports, auxiliary air pumps and air lock doors are satisfactory. Snow removal likewise can easily be effected by slight deflation, and inflation or mechanical removal. Acoustics poses the greatest difficulty. Again the double bubble lessens the problem. Fabrics added to walls have been used both to solve accoustical and instability problems. Heating is possible with forced air fans.

Both extremes of cold and heat tend to decrease the life expectancy of bubbles which at the time of writing was about 10 years. However, their cheapness makes the bubble a desirable way to provide a facility that would not otherwise be possible.

Gores, Harold B. "The Future File: Schoolhouse 2000", Kappan, 56-5, pp. 310-312, January 1975, EJ 109 242.

The schoolhouse of the future will probably be known only as the "centre", where a number of social services will be delivered including health, recreation, information and the arts. The structure of buildings will change. Roofs will be designed to absorb for further use the torrents of energy that beat down upon it. Buildings will be pre-constructed and assembled in a fashion to serve a variety of purposes. The large spaces will be covered by translucent fibreglass domes to control the effects of weather. Many of the changes in construction will hinge upon the need to consume energy.

"How to Sort Out Synthetic Gym Surfaces," Nations Schools, 92-4, October 1973.

There are three main types of synthetic surfaces used as indoor floor surfaces. Polyvinyl chlorides which came in 4 ft. wide strips may be rolled out very quickly, but depends upon a perfectly flat surface to avoid seam irregularities. They do not withstand the effects of sun's rays.

Precast polyurthethanes are also rolled out, but are glued to the floor, thus making them permanent and can also be trued up with a hot pour of in the seams following initial application. They are the most commonly used synthetic surface. Poured-in-place polyurethanes, both the double process type or single, are poured on hot and finished with a tough over-surface bringing the total surface to $\frac{1}{4}$" to 5/8" thickness.

The synthetic surfaces are finding favour because potentially they are not susceptible to buckling or water damage, are easily repaired, do not support combustion and are easily cleaned.

Jones, Tom. "How to Build a Track", University of Wisconsin, Madison, 1955, p. 86, ED 035 161.

The proper construction of track and field facilities is a knowledge that has been built up over the years by a few devoted men in the field. Although the new synthetic surfaces have changed the need for cinders, the proper sub-soil conditions, drainage, etc. is still required. The article also deals with correct placement of pits and runways as well as giving a code for track markings. Finally, a number of the world's best track and field facilities are reviewed. For anyone preparing to build such a facility, this article could be of great value.

Kelsey, Lamar, et. al., "New Generation Gyms: Design Ideas for P. E. in the Seventies," Nations Schools, 84-46, pp. 44-56, December 1969, EJ 012-087.

Three architects present a series of new ideas for P. E. facilities that they feel will help to make facilities more usable for people. Versatility and adaptability are the watchwords. All spaces and surfaces are considered useable. Among the more intregueing ideas are the following:

1. Pivot walls that can be swung out to form butt walls that can be used for handball, storage or film projection.
2. Motorized rolling bleachers that will serve as seating, rebound surfaces on their back side and space dividers - both indoors or out.
3. Large garage-type doors that when opened expose the gymnasium to the open air.
4. The ceiling may be the greatest unused spaces we have. They could be used for storage of mats, and other gymnastics equipment if proper hoists we provided. "People platforms" could be lowered to provide a second story playing surface. Partition walls, nets, etc. can also be lowered for use.
5. Floors should be of synthetic material that can be used for all activities from basketball and track to golf. All types of footwear should be useable on it.
6. Lighting should be indirect.

7. Louvered backs on lockers attached to venting systems ensure odour elimination.
8. Separated swimmers and spectators sections in pools would allow for proper temperature for each. Glass panels and localized heat radiants would facilitate this.
9. Use of earth fill walls to which a light weight roof can be attached provide all-weather facilities.
10. Portable storage cupboards for elementary-school equipment that can be stored in waste space areas are suggested.

The authors acknowledge that the ideas given are more expensive than the tradition, but feel that their added versatility make it worthwhile.

Kelsey, Lamar F., "Sports Facilities: The New Breed", Kappan, 56-5, pp. 321-25, January 1975, EJ 109 242.

New programs and new emphases are causing planners to come up with multi-purpose facilities that can be used for girl's athletics, intramurals, lifetime sports and joint school-community activity playrooms. Shared financing by school and community groups make it easier to come up with a wider spectrum of facilities, including multi-surface synthetic floors, swing-out walls and lighted outdoor areas. Even more exciting are such ideas as co-ed locker rooms and training rooms that can be scheduled for mixed groups or segregated, depending upon the time of year and degree of use by each sex. Storage constitutes the greatest problem for old gyms because of additional equipment needed for the new programs.

If the hassle over facilities and equipment can be minimized, the general good will result because of the need for access to activity areas by out-of-shape North Americans.

"Kids Hate Gym - Try Mini Gyms", American School and University, 44-12, pp. 24-5, 28-29, August 1972, EJ 061-907.

In an age when we extoll the virtues of exercise, we construct schools with gymnasium facilities that require a formalized class assembly and a teacher in class. Alternately we should be considering a system where mini-gyms would be situated around the school in corridors, corners of classrooms, on rooftops and any available spaces. Types of equipment would include climbers, stationary bikes, mats, climbing ropes, etc. The Burnside School in New York City has tried this system out of necessity and has been well-satisfied with the result.

The author makes no mention of accident rate or concern over liability.

Muriarty, R. J., "PERT Planning for Physical Education Facilities," CAHPER Journal, 37-5, pp. 24-29, May-June 1971 and 39-6, pp. 33-37, July-August 1973, ED 096 749.

Because of the phenomenal ~~growthy~~ growth of Physical Education in Canada, there is a great need for guidelines in planning facilities. Physical educators must become facility specialists in order to contribute to the planning, placement, and utilization of the new complexes that are being built. Among the more difficult tasks in developing facilities are justification, recording details of facilities visited, and manipulation and ~~alientaties~~ orientation of areas in projected facilities. In order to alleviate these difficulties, the planning team at the University of Windsor developed three main items: the survey check list, which provides a structured comprehensive approach for recording details of existing or projected facilities; 2) the template for outdoor athletic facilities, and 3) the transparent floor planning kit which consists of transparent plastic sheets over graph paper and various colored, flexible, china pencils which can be used in connection with the templates to develop the preliminary floor plans and to show the basic orientation from court to floor in an evolving facility. In those situations where a major project is undertaken, and the importance of getting the job done with the least amount of valuable human and physical resources is paramount, the Program Evaluation Review Technique is appropriate.

NB: Abstract taker from ERIC microfiche.

Murray, Ralph G., "Huge Sports Complex has Everything," American School and University, 46-10, pp. 24-26, 28, June 1974, EJ 102-600.

Elmira College, the 118 year old institution to first grant equal degrees to women, opened its doors to the first male students in 1969, causing a crowding problem for athletic activities that was solved by the use of geodesic domes for four large areas located on 23 acres of undeveloped countryside. A gymnasium, hockey rink, field house and swimming pool are the major sports facilities housed in the new facilities. When not being used for spectator sports these areas are adapted for use by many students for classes and casual play in a variety of sports.

The triangular-shaped panels are assembled to form tetrahedrons which are then placed in the domed configuration, the total roof painted a gold color and supported by six walls to form an aesthetically pleasing structure.

Lighting and sound have proven to be two very pleasing aspects of the structure with none of the hollow reverberations of the usual gym. Lighting is indirect and very pleasing. Forced air heating is handled by units placed outside the structures which further adds to the quiet accoustical surroundings.

All that is required is money. Total cost is $4,600,000!

Penman, Kenneth H., "Let's Build Useful Gyms," American School and University, 42-12, pp. 14-15, August 1970, EJ 065 040.

Although leading architects espouse the desire to design facilities that make use of the latest materials to enhance the programs as well as to accomodate the new thinking in Physical Education, the vast majority of gyms are being planned by people that have never visited a class or P. E. instructor and thus know little or nothing about how programs have changed since they went to school. Consequently, we are still being saddled with archaic-looking, disfunctional facilities.

A number of areas could use improvement. Starting with the finish coat, we need to paint facilities with exciting colors rather than the drab greys that have been used. A maximum use of landscaping eliminates some of the flat-heat reflecting paved surfaces. Aesthetics should be considered in order not to create a monstrosity that spoils the general appearance of the school. One method is to lower the gym floor so as to bring the roof lines down. Although glass may be aesthetically pleasing, its use causes glare and heat problems. Ventilation is important as is the use of sound-absorbant, tough materials for walls that can be used for many purposes.

Teachers and community leaders should confer with architects to help improve facilities.

"Physical Education Facilities for Elementary Schools", Ontario Department of Education, Toronto, Ontario, Government Publications Centre, McDonald Blvd., Queens Park, Toronto, ED 085 908.

This brochure deals with three basic types of elementary schools: K-6, K-8 and ~~senior~~ Senior elementary. Floor plans and sketches illustrate specifications for the school gymnasium, dressing rooms, drying rooms, boy's and girl's shower rooms, washrooms, instructor's offices, storage areas, stage and playing fields.

Some of the innovative recommendations made are:

1. Doorhandles on inside should be inset for safety.
2. Walls should be unbroken spaces for use as rebound areas - no drinking fountains in gymnasium.
3. Space should be provided in the storage area for outside groups to store equipment and supplies.
4. All playing areas are to be scaled down for elementary school use if it is not possible to use variable sizes, which can be changed for evening adult use.

Physical Education Facilities: A Report, Education Facilities Labs., Inc., New York, April 1975, p. 57, ED 079 819.

New goals in physical education are leading instructors to seek new kinds of athletic facilities. School administrators are in the process of rethinking the classical facilities, i.e. the box shaped gymnasium-facilities designed without sensitivity to the students' desire to participate in games they can play after graduation. This new thinking also includes the design of facilities oriented to the female need to have a place for body exercise. This report seeks to display the various forms and shapes of facilities designed for physical education, inscholastic and intercollegiate sports, and recreation. Although it does not advocate any general solution for everyone, the report displays the more imaginative and economically prudent solutions that have been built or proposed for specific settings.

Ragsdale, Lee and Others, "Dressing Rooms and Related Services Facilities for Physical Education, Athletics and Recreation", AAPER Publication - Sales, 1972, p. 48, ED 064 764.

The purpose of this publication is to identify significant considerations in the planning of dressing-locker rooms and related service facilities such as shower rooms, toilet and lavatory rooms, traveling areas, storage and supply rooms, launderies, training and first-aid rooms, and custodial facilities. However, only a perfunctary treatment of each area has been attempted. Used in conjunction with the listed references and up-to-date information available from architects, the material contained here should provide a sound foundation for planning these facilities.

New or revolutionary ideas included here are:

1. Twenty square feet of space per person at peak load is required in the general dressing-locker area.
2. Synthetic rugging is now recommended for dressing rooms.
3. General faculty dressing room space is recommended.
4. Shower heads should be non-adjustable for direction and at variable heights.
5. Women require 60 or 72 inch lockers for clothing while men can get along with two-teer 36 in. ones.
6. The best arrangement for storage lockers is to place them on top of a concrete block pedestal which also supports a flat slab extending 12" out from the bottom of the lockers to act as seats.

"The Anatomy of the Body Shop", Nations Schools, 92-3, pp. 52-55, September 1975, EJ 081 210.

Provision of an all-purpose lifetime sports complex called "The Body Shop" has been erected in Evanston, Illinois at the James Boyle High School. The concept provides a free choice and access to equipment, media and faculty for students. A two-story structure made up of a central pod surrounded by activity areas, the facility appears to give students the easy access to equipment, coaching and practice for which it was designed. Synthetic ice surfaces, bicycle and jogging tracks are added to the more traditional large-space activity areas. All partitions are moveable so that the small space areas can be modified for use as the need arises. The facility would appear to serve the lifetime sports philosophy well.

Thiebert, Richard P., "On Facilities for Lifetime Sports", An Interview, American School and College, 44-3, pp. 14-18, November 1971, EJ 047-235.

Today's needs for students of all ages are tied up with mass participation. It is foolish to build further large stadiums in the U.S. since there are plenty that can be rented to free the non-spectator facilities for the masses. The major requirement is a large covered surface that can be adapted for many activities. Relatively inexpensive domes made of fabric, either cable supported or by air and can be constructed to handle the largest field space and height requirements for all possible games. Accoustics and lighting are only minor problems.

Structures of this type are required for joint use by community as well as schools. The big stumbling block is not technology, but attitudes of people - those that are still thinking in terms of the structures that were appropriate during the first half of this century.

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Kelsey, Lamar F., "Sports Facilities; The New Breed", Kappan, 56, 5, pp. 321-25, January 1975.

"Kids Hate Gym - Try Mini Gyms", American School and University, 44, 12, pp. 24-25, 28-29, August 1972.

Moriarty, R. J., "PERT Planning for Physical Education Facilities", CAHPER Journal, 37, 5, pp. 24-29, May-June 1971 and 39, 6, pp. 33-37, July-August 1973, ED 096 749.

Murray, Ralph G., "Huge Sports Complex Has Everything", American School and University, 46, 10, pp. 24-26, 28, June 1974.

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Addenda P1

Dr. Roda of the School of Physical Education directed me to three particularly useful sources that are somewhat beyond the topic of this course. They are:

1. AAHPER and the Athletic Institute, Planning Facilities for Athletics, Physical Education and Recreation, 705 Merchandise Mart, Chicago, Illinois 60454. Approx. 9 1/2"

This text is used in the facilities course offered here on campus by the School of Physical Education. It is also a very useful instrument for people in the field, in that the recommended specifications, placement of facilities, planning procedures, utilization requirements, etc. are all covered. This guide is updated every few years.

Of particular interest is chapter 8 on new ideas in facilities pp 100-105. Many of the concepts discussed in this paper are topics therein.

This writer would recommend highly the Facilities Guide for anyone doing research in the area of Physical Education and Recreation. All of the ideas that one can find in the ERIC System are also in the Guide in a very concise form and some from a practitioners' viewpoint.

2. The second major source of note that is worth keeping in a primary reading list is very new. At the moment Dr. Roda has the only copy on campus.

Bronzon, Robert T., New Concepts in Planning and Funding Athletics, Physical Education and Recreation Facilities, Phrenic Intermedia Inc., 292 Cherokee Ave., St. Paul, Minnesota, 55107. Price $9.95 plus 50¢ for handling.

This book is somewhat more futuristic in its orientation, but still does a complete study of facility planning, financing, implementation of synthetic materials, etc. A very cursory investigation would suggest that this book would be well worth including in a primary reading list.

3. An example of the involved procedures in planning facilities is a doctoral thesis by Marvin Gans, "Sequential Steps in Planning Facilities for Health, Physical Education and Recreation," University of Utah, 1972.

This very extensive study of the planning process is also worth recommending.